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ABSTRACT

The need for an information development system for farmers is discussed in this paper. Issues and alternatives are described in terms of the research-extension-teaching trinity, extension services, role combinations, specialist advisor issues, innovations, research orientation, reward structures, and information services. Information gathered in the United States is presented along with information from other areas in the world. The author suggests that modernizing agriculture requires a specialized system which must provide for development, dissemination, and integration of new knowledge into individual farming operations; that the degree of functional differentiation and organizational specialization is related to the current state of agricultural development; that the utility of organizational arrangements in the system can best be judged in terms of the functional requisites that must be met; and that information systems require integration into the adopting situation. (PS)

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ORGANIZATIONAL ISSUES INVOLVED IN THE DEVELOPMENT AND OPERATION OF FARM INFORMATIONAL SYSTEMS FOR MODERNIZING AGRICULTURE[1]

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I. Prologue

Functional Requisites

This paper takes the position that the time is past when folk knowledge will suffice for modernizing agriculture. Rather, that scientific information is required and that it must be developed, transformed and delivered by specialists, working in specialized organizations. The farmer in turn, must integrate it with supplies, credit and services delivered through still other channels. All require organizational specialization and in turn interorganizational articulation to function on behalf of the farmers they are intended to serve.

Functionally, we start with the idea (1) that an information development system independent of the farmer's own social system is necessary, (2) that the knowledge needed derives mainly from the basic sciences, (3) that its development requires both basic and applied scientists the last of whom are interested in intervening in the phenomena of the basic sciences, either merely for the sake of doing so, or for creating potentially useful innovations for other than the scientists themselves. This obviously, is no matter for amateurs

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or for informal organizational arrangements of the "Thomas Edison type". A proper supporting organization, resources, specialized equipment and time allocated to the developmental task is necessary.[3]

A second function, also requiring specialization, is dissemination of the information that has been transformed into a potentially useful innovations. The specialty nature of this function derives from the fact that there are different ways of communicating with and influencing people, and that some are better than others. The body of knowledge has to do with the better ways, for whom and under what conditions, constitutes the subject matter of this specialty.[4] The skills, the organizational arrangement, and resources needed is necessarily quite different from that needed for the research or development function which we must not overlook and offer little prospect of diminishing (Havelock, 1971, 7-21, Slocum, 1969).

Lest it be overlooked, we must include local adaptive testing either as a part of research or extension. Havelock, (1970, 7-21) has observed that quite aside from how sophisticated user clients may eventually become and how capable they are of translating abstract knowledge into usable practice, indications are that there will continue to be a need for specialized intermediaries to take care of the information transfer or linking function.

Third, there is the matter of putting the innovations and pieces of information together in a usable combination for farmers. This function or process we refer to as

integration, a matter requiring no little skill on the part of the farmer. Problems of its integration into the operations of farmers plainly point to the need for making the information delivered as nearly usable locally as possible and at the same to help farmers achieve an appropriate synthesis.

With organizational specialization required for both information development (research) and information dissemination (extension) appropriate articulation of the parts of the system is essential to make it work in the interests of the farmer. Interaction (mutual influencing) between the subsystems is necessary. Information must be developed, transformed, and transmitted but reactions of farmers to its adequacy and the manner of its delivery, plus their own unfulfilled information needs in turn must be transmitted to researchers and their administrators, either directly, or through extension workers.

The Organizational Context

Functional differentiation of the dissemination and integration functions and the resulting innovation and organizational specialization provides the main context in which organizational issues discussed in this paper emerge.[5]

Issues also emerge from the organizational and functional differentiation that occur in the growth of the component subsystems, often as a result of the self-seeking designs of those within (Hefferlin, 1969, 25-30). Thus, research gets divided into basic and applied and in turn into

narrow subject matter specialties; extension agencies into information offices, media specialty sections, field staff and the like, often with professionalization of each of the specialties. To be sure appropriate differentiation of activities and organizational specialization is a requirement for the development and delivery of scientific farm information, but the writer holds that the appropriate amount is related to the relative stage of development of the agriculture it is expected to serve. Thus, over-differentiation and specialization may actually result in dysfunctional consequences where the farm informational needs and organizational structure of agriculture are comparatively simple. This, coupled with the top-down planning and inclinations to specialization along crop and livestock lines intensifies the need for building integrating mechanisms into the system on the one hand, and resisting dysfunctional kinds of differentiation on the other.

This paper can only allude to a few over-differentiated conditions that tend to occur and to a few specific ways for introducing needed integrating mechanisms.

II. Issues and Alternatives

For an inventory and assessment of organizational issues, the author has drawn on (1) the documented experiences with the so-called "land-grant college systems", mostly in the United States.[6] (2) an extensive study of the agricultural department centered farm information system in Taiwan, (Lionberger and Chang, 1970) and (3) observation from Indian

efforts to develop agricultural research and extension (Randhawa, 1963). Also, evaluative assessments of the Intensive Agricultural Development Programs in India (Johnson and Malone, 1971 and Expert Committee on Assessment and Evaluation, 1969).

Function vs Organization of the Research - Extension - Teaching Trinity

A much debated issue in the organization and operation of farm information systems, centers about the utility of basic features of so-called "land-grant colleges" which originated in the United States and have often been exported to and/or borrowed by other countries. These colleges combine responsibility for research and extension activities, and resident teaching of agricultural students in a single institution quite autonomous from government control. The inclination has been for proponents of these colleges to insist on the sanctity of the organizational arrangement and thus for its transfer to the new environment. The author believes that the functional combination of the three activities (research, extension, and teaching) is inviolate but that there are satisfactory organizational alternatives for doing this.[7] One of these is to lodge responsibility for research or extension (farmer education) or both in governmental agricultural departments. Failure to distinguish between functional and organization integration of this trio has led to much useless debate and talking past each other. What is organizationally best is dependent upon many things which include the existing structure for supplying other goods and services to farmers,

the relative state of agricultural development, and the management capacity of the farmers themselves. Some of the issues about the utility of kinds of organizational arrangements and implications for getting farmers to use scientific farm information are discussed in the next section.

A Home for Extension

Alternatives commonly used are (1) to assign responsibility for extension (farmer education) in the agricultural colleges which do the research and teach resident students agricultural courses or (2) assign it to a government agency, commonly a state department of agriculture, which sometimes also renders other services to farmers. A third, less used one, is for farmers themselves to assume responsibility for their own extension services as in farmers cooperatives in Denmark and Taiwan (Kwoh, 1964).

Certainly, the first has the advantage of linking extension (farmer education) to the research sources from which the information emerges, and in turn is responsive to the needs of farmers which are communicated back, through the system to researchers and administrators. This type of organizational arrangement can also add an element of realism to the resident teaching, for which colleges are also responsible. With the professional quality of extension generally recognized along with research and teaching, it gets a reasonably compatable home in the college or university even though it may well be assigned a lower status. The close organizational linkages of research, teaching and extension has a potential for being responsive to the needs of

each and at the same time to the interests of farmers -- assuming that the last are recognized as important referents, capable of meting out rewards and reprisals to researchers and extension workers. (Ruttan, 1968)

Still another advantage of this system is that farm advisors can be educated in the same agency that does the research and extends the knowledge that is developed to farmers. Advisors who obtain their agricultural education in these colleges come to respect the method of doing research and the research product. This means that they do not have to be sold on, or be convinced of the utility of what they will be expected to communicate to farmers. This reduces by one, the number of adopter clienteles that must be convinced about the utility of the information that is to be disseminated.

On the negative side, for the university home, pure academics who themselves avoid linking roles, sometimes regard colleagues who engage in such activities as second-class citizens. This, of course, has obvious consequences for involving faculty members in the linking role activity.

Where the relatively autonomous research, extension and resident teaching trio is used, there is usually also an assumption that necessary supplies, credit and services are readily available and thus, also an efficient delivery system for this purpose. In the relatively highly developed agricultural situations, this is probably a safe assumption; but in the less developed ones, it is not. (Byrnes and the Madigan rejoinder, 1968) Also, less management skill is

required to use information when it is closely associated with other needed inputs than when the information is separately delivered, for example, instructions on the insecticide container, versus insecticides in a paper bag from one place and information in a brochure from another.

A government agency as an alternative home for extension in developing countries has the advantage of being associated with the chief planning and program executing agency. Characteristically, this is a state, national or regional department of agriculture, which also exercises some control over the delivery of supplies, services, and credit, all of which are likely to be in short supply. Thus, government agencies are in a position to coordinate and presumably also facilitate their delivery.

In Taiwan, where such a system is used, the needs and the influence of farmers are communicated through the information system by a series of advisory committees from local to the state level and strong farmers' associations, which are able to register their interests and influence. Accordingly, research and extension are kept responsive to the needs of farmers, all within the limits of national plans and programs that transcend agriculture.

On the negative side, such a system intensifies information retrieval, transfer and feedback to the research source. Also, there is an inclination to use the extension agency for monitoring and controlling government programs, which is likely to be a dysfunctional role combination.

Perhaps the government home has its greatest utility in relatively undifferentiated agricultural information systems, characteristic of the early developmental phases and situations where government is heavily involved in supplying other agricultural inputs, and the university home, where delivery of information can operate as a separate specialty with assurance that other requirements for agricultural development will be available when and where needed for farmers who are capable of integrating the new information with the other ingredients into their own farming operations, quite unassisted -- thus farmers who have a relatively high level of management ability.

Functional and Dysfunctional Role Combinations

In the process of development, farm information functions and activities tend to be added to or associated with already existing agencies or programs. Sometimes these associations hinder the development, transformation and dissemination of scientific farm information to farmers and getting it integrated into their farming operations.

There are also role combinations that are destroyed prematurely by differentiation before division is either needed or likely to be functional. Such problems are intensified by lack of knowledge and skills in "undifferentiation", when the process is allowed to go too far. On the other hand, differentiation and specialization as processes of social change are familiar, understood, readily permitted, and generally welcomed.

Information Alone, or With Other Services. A common functional differentiation in extension services to farmers is between educational effort associated with government programs, really mostly administrative, and farmer education alone. Typical of the former is the public office (government) line operated extension service in Taiwan, concerned mostly with food production, on the one hand, and the alternate Farmers' Association extension, concerned mostly with educational matters on the other. (Lionberger and Chang, 1970, 109-181) A parallel example in the United States is the Soil Conservation Service, mostly concerned with getting more soil conservation practices applied to the land and the cooperative extension service which is quite distinctively educational in orientation. (Rogers, 1960, 292-303) This might at first thought, be regarded as wasteful duplication, and as a division likely to cause dissent and destructive cross-purpose efforts. In Taiwan, as well as in the United States, both occurs, but mutually supportive arrangements can be made between activities of this kind, as in Taiwan where public office extension advisors are often loaned to Farmers' Association Township offices. Of the the two, the farmers' own Farmers' Association extension is the most extensively used for information and

advise. Although advantages and disadvantages of the divided versus combined activity are not clearly on one side or the other, separation has the advantage of removing regulatory and sometimes punitive actions against farmers from the purely educational, usually a dysfunctional combination. (Organization for European Economic Cooperation, 1950). Also, for educational matters, the main system linkages should be through the information development (research) channels, whereas for carrying out government programs, the chief regulatory referent is necessarily the government agency responsible for carrying out the programs.

Generalist -- Specialist Advisor Issues. There comes a stage of agricultural development when informational specialists must replace or supplement general purpose farm advisors (Slocum, 1969); also when advisors can confine themselves to farm information quite to the exclusion of other duties.

Although farmers in the less developed countries are much more capable of using abstract knowledge in their farm management decision than the farmer peasant stereotype suggests, management ability is still relatively low. Accordingly, farmers with low management ability are required to integrate supplies, credit, and information from a variety of sources into their own farming operations. For the integrative help needed, it would seem that a generalist who knows something about most things a farmer has to consider in his management decisions plus an understanding of his local situation is

likely to be more helpful than a specialist who knows a lot about a little.[8] For sure, the time eventually comes when specialty information and specialists must be added. But when transition to greater specialization becomes necessary, an informal arrangement where one generalist in a local extension office learns a little more than others about something like mushrooms, another a little extra about citrus crops and still another about garden crops as is sometimes done in township extension offices in Taiwan may be quite appropriate as a first step.

Another kind of generalist useful in the early stages of agricultural development is exemplified in the general purpose VLW in India, who may also help the farmer get supplies, credit, or make application for government assistance or clearances.[9] Additional services of this kind are also sometimes required of Farmers' Association extension advisors in Taiwan, as was also the case in the early days of agricultural extension in the United States. County agents assumed many additional duties including helping farmers lay out terraces, arranging for the cooperative purchase of fertilizer in carload lots, helping organize and conduct feeder cattle and feeder pig sales. This multipurpose assistance may be more useful to farmers with low management abilities who are just beginning to experience the need for acquiring, combining and integrating off-farm inputs into their farming operations than farmers with more experience with and knowledge about the requirements of commercial agriculture. Perhaps pure education for extension advisors might well be

reserved for a time when the delivery of credit, services, and supplies are assured and farmers have enough farm management ability to package their own information and services.

Alternatives for Testing of Potentially Useful Innovations. At almost any level of agricultural development, investigation and research in both the basic and applied sciences must be done by well educated specialists, who think, feel and act like the specialists they are, with extension also eventually emerging as a professionalized specialty. But at the adaptive testing level, (in the information transformation process from theory to use) the relatively undifferentiated arrangement used in Taiwan is highly conducive to information flow from local test plots to farmers. Agricultural technicians employed in locality oriented district agricultural improvement stations do both adaptive testing (research) and extension work with little inclination to identify with either and are accordingly not possessed with research over extension feelings of superiority. In addition, progressive farmers and local farm advisors are involved in the adaptive testing, thus creating a farm -- farm advisor -- researcher combination highly conducive to communicative exchange and interaction and thus also to the appropriate functioning of the system on behalf of Taiwan farmers who even though small have already become very much a part of modern commercialized agriculture. (Christensen, 1968) In fact, "undifferentiation" of these roles at the adaptive testing level may be conducive to interaction

and information transfer at many stages of agricultural development, even the highly advanced.

Area Versus Commodity Research Orientation

Research can be oriented quite specifically to crop and livestock specialties, as for example, the International Rice Research Institute in the Philippines and the commodity emphasis of the Indian Council of Agricultural Research (Randhawa, 1963). It can also be mainly oriented to the total agriculture of a region, state or district, like agricultural colleges in the United States (Rogers, 1960, 303-311). Surely, the first has a very high potential for intensive research and development for particular kinds of crops or livestock. On the other hand, an area orientation has a distinct advantage of directing attention and effort to the combined agriculture of a geographic area and thus to local adaptability considerations. A good within-country example of the two kinds of organizations are the commodity oriented research institutes and the area oriented district agricultural experiment stations in Taiwan. Although other reasons other than type of organization also apply as explanations, contacts of extension advisors with agricultural technicians (combined researchers and extension workers) in the improvement stations were much more numerous and valued than with those in this commodity oriented institutes. (Lionberger and Chang, 1970, 168). This was also to some extent true of contacts with local farmers (Lionberger and Chang, 1968, 30-31).

This disproportionate use and high influence of improvement stations over the research institutes seem to derive from

(1) The more favorable opportunity provided to test innovations under local conditions closely akin to those existing on farms in the area.

(2) The low differentiation of the researcher -- farm advisor -- farmer roles in the improvement stations.

(3) The local assessibility (physical and social) of improvement station personnel to farmers and agricultural advisors; social because the technicians were not greatly different educationally and occupationally from farmers and physically because they were located close to where farmers and farm advisors live.

(4) The active manner in which efforts are made to bridge the gap between adaptive testing and actual use of the innovations being tested at the improvement stations. These include personal contacts, joint adaptive testing arrangements, and publication of local adaptive testing results.

The Reward Structure

The general hypothesis posed here is that agricultural colleges that become relatively autonomous from government influence and domination require alternative sources of support to properly function as a scientific farm information system. Agricultural colleges in the United States which

are quite removed from government intervention nevertheless generally have strong support from the publics which they serve. Special interest groups which demand hearings and services also support the college when appropriations are threatened and when advisaries seek to discredit their work. Also such constituencies whether viewed collectively as the general public, or specifically as apple-growers, dairymen, beef-cattle raisers, housewives, etc., all may serve as reference groups to the faculty, with a potential also for allocating rewards and reprisals for services rendered, i.e., research bulletins published, meetings held and talks given on their behalf. Without this kind of support, demands of agricultural colleges for autonomy from state departments of agriculture, where they are often attached, may if achieved, leave the college suspended in social space without much relevance to anybody and almost no source of support. (Ruttan, 1968)

Yet the potential for such support (in a developing agriculture) may well exist before it is recognized, mobilized and utilized. (Hoffshommer, and Dubey, 1961) Accordingly, it should be cultivated mainly by selling what the college has to offer and by rendering services to farmers. Unless researchers can receive some reward (satisfaction and support) from writing reports for farmers and the general public rather than journal articles for colleagues, probably little deference to their needs can be expected, short of government compulsion which in turn is likely to be less effective.

Growth of the System by Cooptation

Those who manage and operate the official farm information services can often get help from individuals and agencies not officially a part of it. Indeed, they ought to. Agricultural industries ordinarily have their own research activities in which scientific farm information is developed, often packaged (e.g., into bags of fertilizer, tractors, nutritionally fortified feed, insecticides, etc.) for convenient use as well as independently communicated. Channels used include dealers, product labels, containers, dispensers, instruction sheets, brochures, trade magazines, advertisements, dinner meetings with farmers and the like. In fact the industrial output of farm information in the United States now probably rivals that of the public system in quality, magnitude and coverage.

In societies where delivery of farm supplies and services are mainly the responsibility of the public sector, service personnel, containers, government representatives etc., can likewise serve as vehicles for communicating information to farmers. These certainly should be used expediciously to deliver information in a timely, usable manner. We might, for a moment, think of all instructions removed from the cartons and containers of the products we buy, of dealers without knowledge about the products they sell, and no knowledgeable servicemen or company agents. Then we can immediately recognize just how important information through commercial channels is. Indeed agents of business

and industry, particularly local dealers, can sometimes achieve "most influence" status in the adoption decision of farmers (Lionberger, 1963; Beal and Bohlen, 1960-1961; Gross and Ryan, 1950). If more was known about the conditions under which this legitimating level of influence occurs, the effectiveness of commercial sources of information probably could be greatly enhanced.

A second help possibility is from mass media agents, which are not officially a part of the farm informational system, but which can serve as important extensions of it, generally with very high exposure potential and even legitimating possibilities. As a minimum, these sources are very useful in creating general awareness of innovations in farming and in providing additional or general information about farm matters and issues (Bohlen, 1964, 282). By virtue of the speed with which information can be communicated, to many people through the mass media, and the access that agricultural researchers and extension representatives ordinarily have to them, the mass media are ideally suited for informing farmers quickly about new developments in farming (Rogers and Shoemaker, 1971, 252 and Copp, Sill and Brown, 1958).

Methods for establishing linkages with the farm supply agencies whether public or private, and the mass media necessarily vary with the conditions prevailing in the particular country. Farm informational releases to privately owned newspapers, and magazines and scripts to radio in countries like the United States are welcome and used. Feature stories are sought from the university by farm journals. In Taiwan, these

are accepted and communicated for a consideration. In India with radio networks under central government control, the entre would be through government. Perhaps the relationship between farm supply industries and agricultural colleges in the United States is almost one of interaction. Information from the experiment stations are incorporated into releases from the private source and adaptive testing of commercial products is commonly undertaken by agricultural experiment stations. Representatives from both the colleges and business enterprises, likely to be agricultural college graduates may appear in jointly arranged educational meetings with farmers. In any case, persons last in the supply line from industry to farmers are in a strategic position to advise and inform farmers about supplies and services.

The Farmer Subsystem as Information System

Of all the unofficial agents that can be enlisted as a part of the farm informational system, the farmers themselves have the greatest multiplying potential (Rogers and Shoemaker, 1971, 176-179). Farmers who talk freely to each other about matters related to farming are members of farmilies, friendship groups, neighborhoods, villages, communities, and farm organizations, all of which facilitate this communication and probably enhances confidence in what is communicated. In addition to information which probably couldn't be obtained elsewhere e.g., local adaptability and social consequences information and about innovations and new technologies apply locally

can be best provided in this manner. Although sometimes downgraded in credibility in comparison to other sources as shown in a Taiwan study (Lin, 1969, 59-61), United States studies seem to generally place farmers in the most influence position. (Lionberger 1963, Lionberger and Francis, 1969 a and b).

Structural issues, in interpersonal communication, of which there are many, arise from the way personal attributes and social groups facilitate or restrict evaluative and farm information choices of farmers. Although this is the frequent concern of "diffusion" research from which there are many findings on the subject, (Jones, 1967) further consideration of the matter in this paper must be ruled out.

Homophily -- Heterophily Issues

The conditions under which persons choose others as sources of farm information and continue to interact with them are indeed complex (Homans, 1961) perhaps also not very well understood -- despite a vast amount of research and theorizing on the subject (Barnlund, 1968). However, homophily -- heterophily of information seeker and sought issues have repeatedly appeared (for examply Blau, 1962 -- Lionberger and Campbell, 1971 -- Rogers and Bhowmik, 1970-1971). To be sure there must be some differences between information seekers and soughts. Obviously, little information can be obtained from these who don't have much to offer and little is likely to be generated by interaction among those who have little to share. Yet, avoidance can occur if the knowledge gap is too great or if persons are

otherwise too greatly different from each other, particularly if some of these represent areas of high personal sensitivity. Also, since social costs and obligations are incurred by merely asking for information, the gain to self must exceed the cost as well as provide something of value (esteem, information, service, or material) to the sought if the relationship is to be sustained (Blau, 1962).

In terms of personal attributes, to which status is accorded, persons seeking information are likely to look up the scale, but not greatly beyond their own level unless there are other means of legitimating the relationship like paying a doctor as a condition of getting his professional advice. Even though persons more knowledgeable than self are selected, seekers may prefer others similar to themselves in most other ways, thus the homophily issue. This surely is a partial explanation of the higher use made of elementary school than college educated farm advisors as one Indian study has shown (Allahabad Agricultural Institute, 1957) and in the frequent use of and high confidence that Taiwan farmers placed on farm advisors who not greatly different from themselves except for their continuing exposure to "reputable" research sources of farm information. (Lionberger and Chang, 1970, 110-117). Over three-fourths of the farm advisors were involved in actual farming operations. At the same time, they generally felt an obligation to try out innovations before recommending them to farmers. (pp. 161-162). These elementary or high school trained (no college

graduates) advisors were held in very high esteem by the farmers who seemingly more often than in the United States accepted an innovation alone on the basis of the information and advice received from the farm advisors.[10]

Yet, in attempts to upgrade farm advisement, as with the VLW in India more formal education is commonly recommended. This kind of upgrading if done prematurely may have harmful rather than helpful effects. This would be particularly true if a college education creates attitudes of self superiority and disrespect for the views of farmers with whom farm advisors are expected to communicate (Rogers and Bhowmik, 1970-71); also if a college education is heavily oriented to acquiring knowledge too abstract for farmers to use.

III. Summary and Conclusion

This paper holds that

(1) Modernizing agriculture, and thus the continuing supply of scientific farm information that farmers need requires a specialized system, which as a minimum

(2) must provide for development, dissemination, and integration of the new knowledge into individual farming operations.

(3) The degree of functional differentiation and organizational specialization that best serve farmers is clearly related to the current state of agricultural development in that country

and the manner in which other support to agriculture is managed.

(4) The utility of organizational arrangements in the system can best be judged in terms of the functional requisites that must be met, recognizing at the same time that there may be many organizational alternatives for doing this.

(5) Information systems themselves, as the land-grant colleges used in the United States require integration into the adopting situation and thus not mere transplant of the system and its organization from one country to another.

The organizational issues noted in this paper are only a few that do or are likely to emerge from developing, managing and adapting specialized farm information systems to the current and emergent scientific farm informational needs of farmers. Suggestions concerning comparative alternatives (mostly organizational) had best be thought of as issues to consider and resolved as local expediency requires, but most of all, as subjects for further consideration, thought and research.

FOOTNOTES

[3]A theoretical model of this type and the organizational issues involved are described by Lionberger and Chang, 1970, 1-17. A variety of other information system models are described at length by Havelock, 1971, 3, 1-35, 10, 27-55; and one very similar to this one by Coughenour (1968).

[4]The basic content of this subject matter abstracted from diffusion research is briefly summarized by Jones (1967), and in detail by Rogers and Shoemaker, 1971.

[5]The operational definition used here is that a social system is constituted by the interaction of a plurality of individual actors whose relations to each other are mutually oriented (i.e., are degined and mediated by a system of culturally structured and shared expectations, Swanson (1964).

[6]A good evaluative treatment of this experience with emerging strengths and weakness of the system may be found in a book by Kellogg and Knapp.

[7]The informational systems model which serves as a base for much of the theorizing in this paper and which is essentially a "land-grant college" prototype is presented in another paper by Lionberger (1971) somewhat similar to this one, but with an emphasis on specifying organizational features of what might be thought of as an "ideal" systems model. This draws heavily on the views and concepts presented in an earlier paper by Coughenour (1968).

[8]This is discussed in still other contexts by Havelock, (1971, 7-20) with much the same conclusions. There are also homophily-heterophily issues involved (Rogers and Bhowmik, (1970-71).

[9]Their crucial role in agricultural development programs is recognized and emphasized by the report of the Expert Committee on Assessment and Evaluation (1969) which made a general assessment of conditions and influences contricution to successes and failures of the Intensive Agricultural Development Program in India, beginning in 1959 and still in process.

[10]Almost 28 percent of the new farm practices adopted by farmers in an economically advantaged village and 18.9 percent of those adopted in a less favorably situated economically were adopted solely on the basis of information obtained from extension sources (Lin, 1969, 136). This is much higher than the practice adoptions attributed to extension advisement in any of our Missouri studies.

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